

EXEMPLAR SOLUTIONS CHEMISTRY

Chapter 4: The d- and f- Block Elements.

Class
12



Powered by



Chapter 4

The d- and f- Block Elements.

I. Multiple Choice Questions (Type-I)

1. Electronic configuration of a transition element X in +3 oxidation state is $[\text{Ar}]3d^5$. What is its atomic number?

- (i) 25
- (ii) 26
- (iii) 27
- (iv) 24

Solution:

Option (ii) is the answer.

2. The electronic configuration of Cu(II) is $3d^9$ whereas that of Cu(I) is $3d^{10}$. Which of the following is correct?

- (i) Cu(II) is more stable
- (ii) Cu(II) is less stable
- (iii) Cu(I) and Cu(II) are equally stable
- (iv) Stability of Cu(I) and Cu(II) depends on the nature of copper salts

Solution:

Option (i) is the answer.

3. Metallic radii of some transition elements are given below. Which of these elements will have the highest density?

Element	Fe	Co	Ni	Cu
Metallic radii/pm	126	125	125	128

- (i) Fe
- (ii) Ni
- (iii) Co
- (iv) Cu

Solution:

Option (iv) is the answer.

4. Generally, transition elements form coloured salts due to the presence of unpaired electrons. Which of the following compounds will be coloured in solid-state?

- (i) Ag_2SO_4
- (ii) CuF_2
- (iii) ZnF_2
- (iv) Cu_2Cl_2

Solution:

Option (ii) is the answer

5. On addition of a small amount of KMnO_4 to concentrated H_2SO_4 , a green oily compound is obtained which is highly explosive. Identify the compound from the following.

- (i) Mn_2O_7
- (ii) MnO_2
- (iii) MnSO_4

(iv) Mn_2O_3

Solution;

Option (i) is the answer.

6. The magnetic nature of elements depends on the presence of unpaired electrons. Identify the configuration of transition element, which shows the highest magnetic moment.

(i) $3d^7$

(ii) $3d^5$

(iii) $3d^8$

(iv) $3d^2$

Solution:

Option (ii) is the answer.

7. Which of the following oxidation state is common for all lanthanoids?

(i) +2

(ii) +3

(iii) +4

(iv) +5

Solution:

Option (ii) is the answer.

8. Which of the following reactions are disproportionation reactions?

(a) $\text{Cu}^+ \rightarrow \text{Cu}^{2+} + \text{Cu}$

(b) $3\text{MnO}_4^- + 4\text{H}^+ \rightarrow 2\text{MnO}_4^- + \text{MnO}_2 + 2\text{H}_2\text{O}$

(c) $2\text{KMnO}_4 \rightarrow \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$

(d) $2\text{MnO}_4^- + 3\text{Mn}^{2+} + 2\text{H}_2\text{O} \rightarrow 5\text{MnO}_2 + 4\text{H}^+$

(i) a, b

(ii) a, b, c

(iii) b, c, d

(iv) a, d

Solution:

Option (i) is the answer.

9. When KMnO_4 solution is added to the oxalic acid solution, the decolourisation is slow in the beginning but becomes instantaneous after some time because

(i) CO_2 is formed as the product.

(ii) The reaction is exothermic.

(iii) MnO_4^- catalyses the reaction.

(iv) Mn^{2+} acts as an autocatalyst.

Solution:

Option (iv) is the answer.

10. There are 14 elements in the actinoid series. Which of the following elements does not belong to this series?

(i) U

- (ii) Np
- (iii) Tm
- (iv) Fm

Solution:

Option (iii) is the answer.

11. KMnO_4 acts as an oxidising agent in acidic medium. The number of moles of KMnO_4 that will be needed to react with one mole of sulphide ions in acidic solution is

- (i) $\frac{2}{5}$
- (ii) $\frac{3}{5}$
- (iii) $\frac{4}{5}$
- (iv) $\frac{1}{5}$

Solution:

Option (i) is the answer.

12. Which of the following is amphoteric oxide?

Mn_2O_7 , CrO_3 , Cr_2O_3 , CrO , V_2O_5 , V_2O_4

- (i) V_2O_5 , Cr_2O_3
- (ii) Mn_2O_7 , CrO_3
- (iii) CrO , V_2O_5
- (iv) V_2O_5 , V_2O_4

Solution:

Option (i) is the answer

13. Gadolinium belongs to 4f series. It's atomic number is 64. Which of the following is the correct electronic configuration of gadolinium?

- (i) $[\text{Xe}] 4f 7 5d 16s^2$
- (ii) $[\text{Xe}] 4f 6 5d 26s^2$
- (iii) $[\text{Xe}] 4f 8 6d^2$
- (iv) $[\text{Xe}] 4f 9 5s^1$

Solution:

Option (i) is the answer.

14. Interstitial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following is not the characteristic property of interstitial compounds?

- (i) They have high melting points in comparison to pure metals.
- (ii) They are very hard.
- (iii) They retain metallic conductivity.
- (iv) They are chemically very reactive.

Solution:

Option (iv) is the answer

15. The magnetic moment is associated with its spin angular momentum and orbital angular momentum. Spin only magnetic moment value of Cr^{3+} ion is

_____.

- (i) 2.87 B.M.
- (ii) 3.87 B.M.
- (iii) 3.47 B.M.
- (iv) 3.57 B.M

Solution:

Option (ii) is the answer.

16. KMnO_4 acts as an oxidising agent in alkaline medium. When alkaline KMnO_4 is treated with KI, iodide ion is oxidised to _____.

- (i) I_2
- (ii) IO^-
- (iii) IO_3^-
- (iv) IO_4^-

Solution:

Option (iii) is the answer.

17. Which of the following statements is not correct?

- (i) Copper liberates hydrogen from acids.
- (ii) In its higher oxidation states, manganese forms stable compounds with oxygen and fluorine.
- (iii) Mn^{3+} and Co^{3+} are oxidising agents in aqueous solution.
- (iv) Ti^{2+} and Cr^{2+} are reducing agents in aqueous solution.

Solution:

Option (i) is the answer.

18. When acidified $\text{K}_2\text{Cr}_2\text{O}_7$ solution is added to Sn^{2+} salts then Sn^{2+} changes to

- (i) Sn
- (ii) Sn^{3+}
- (iii) Sn^{4+}
- (iv) Sn

Solution:

Option (iii) is the answer.

19. Highest oxidation state of manganese in fluoride is +4 (MnF_4) but highest oxidation state in oxides is +7 (Mn_2O_7) because _____.

- (i) fluorine is more electronegative than oxygen.
- (ii) fluorine does not possess d-orbitals.
- (iii) fluorine stabilises lower oxidation state.
- (iv) in covalent compounds, fluorine can form a single bond only while oxygen forms double bond.

Solution:

Option (iv) is the answer.

20. Although Zirconium belongs to the 4d transition series and Hafnium to 5d transition series even then they show similar physical and chemical properties because _____.

- (i) both belong to d-block.
- (ii) both have the same number of electrons.
- (iii) both have a similar atomic radius.
- (iv) both belong to the same group of the periodic table

Solution:

Option (iii) is the answer

21. Why is HCl not used to make the medium acidic in oxidation reactions of KMnO_4 in an acidic medium?

- (i) Both HCl and KMnO_4 act as oxidising agents.
- (ii) KMnO_4 oxidises HCl into Cl_2 which is also an oxidising agent.
- (iii) KMnO_4 is a weaker oxidising agent than HCl.
- (iv) KMnO_4 acts as a reducing agent in the presence of HCl.

Solution:

Option (ii) is the answer.

II. Multiple Choice Questions (Type-II)

Note: In the following questions two or more options may be correct.

22. Generally, transition elements and their salts are coloured due to the presence of unpaired electrons in metal ions. Which of the following compounds are coloured?

- (i) KMnO_4
- (ii) $\text{Ce}(\text{SO}_4)_2$
- (iii) TiCl_4
- (iv) Cu_2Cl_2

Solution;

Option (i) and (ii) are the answers.

23. Transition elements show a magnetic moment due to spin and orbital motion of electrons. Which of the following metallic ions have almost the same spin only magnetic moment?

- (i) Co^{2+}
- (ii) Cr^{2+}
- (iii) Mn^{2+}
- (iv) Cr^{3+}

Solution:

Option (i) and (iv) are the answers.

24. In the form of dichromate, Cr (VI) is a strong oxidising agent in acidic medium but Mo (VI) in MoO_3 and W (VI) in WO_3 are not because _____.

- (i) Cr (VI) is more stable than Mo(VI) and W(VI).
- (ii) Mo(VI) and W(VI) are more stable than Cr(VI).
- (iii) Higher oxidation states of heavier members of group-6 of transition series are more stable.
- (iv) Lower oxidation states of heavier members of group-6 of transition series

are more stable.

Solution:

Option (ii) and (iii) are the answers.

25. Which of the following actinoids show oxidation states up to +7?

(i) Am

(ii) Pu

(iii) U

(iv) Np

Solution:

Option (ii) and (iv) are the answers.

26. General electronic configuration of actinoids is $(n-2)f^{1-14}(n-1)d^{0-2}ns^2$. Which of the following actinoids have one electron in 6d orbital?

(i) U (Atomic no. 92)

(ii) Np (Atomic no. 93)

(iii) Pu (Atomic no. 94)

(iv) Am (Atomic no. 95)

Solution:

Option (i) and (ii) are the answers.

27. Which of the following lanthanoids show +2 oxidation state besides the characteristic oxidation state +3 of lanthanoids?

(i) Ce

(ii) Eu

(iii) Yb

(iv) Ho

Solution:

Option (ii) and (iii) are the answers.

28. Which of the following ions show higher spin only magnetic moment value?

(i) Ti^{3+}

(ii) Mn^{2+}

(iii) Fe^{2+}

(iv) Co^{3+}

Solution:

Option (ii) and (iii) is the answer.

29. Transition elements form binary compounds with halogens. Which of the following elements will form MF_3 type compounds?

(i) Cr

(ii) Co

(iii) Cu

(iv) Ni

Solution:

Option (i) and (ii) are the answers.

30. Which of the following will not act as oxidising agents?

- (i) CrO_3
- (ii) MoO_3
- (iii) WO_3
- (iv) CrO_4^{2-}

Solution:

Option (ii) and (iii) are the answers.

31. Although +3 is the characteristic oxidation state for lanthanoids but cerium also shows +4 oxidation state because _____.

- (i) it has variable ionisation enthalpy
- (ii) it tends to attain the noble gas configuration
- (iii) it tends to attain f 0 configuration
- (iv) it resembles Pb^{4+}

Solution:

Option (ii) and (iii) are the answers.

III. Short Answer Type

32. Why does copper not replace hydrogen from acids?

Solution:

A positive reduction potential means the reduced form of Cu is more stable than hydrogen. Thus, Cu is less reactive than hydrogen and cannot displace it from acids.

33. Why E° values for Mn, Ni and Zn are more negative than expected?

Solution:

$\text{Mn}^{2+}(3d^5)$ and $\text{Zn}^{2+}(3d^{10})$ have half-filled and filled d orbitals which give them stability and therefore prefer to stay that way and not get reduced. As for $\text{Ni}^{2+}(3d^8)$, it has very high negative hydration enthalpy which gets balanced by first and second ionization enthalpy.

34. Why first ionisation enthalpy of Cr is lower than that of Zn?

Solution:

First ionisation enthalpy of Cr is lower than that of Zn. If we see the electronic configuration of Cr and Zn

Cr – $[\text{Ar}] 3d^5 4s^1$

Zn – $[\text{Ar}] 3d^{10} 4s^2$

Removing an electron from a half-filled 4s orbital requires lesser energy than removing an electron from a filled stable 4s orbital.

35. Transition elements show high melting points. Why?

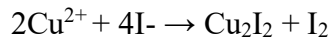
Solution:

Transition elements have strong metallic bonds. Breaking those bonds becomes harder that means

melting these elements will be difficult. So, melting points are higher for transition elements.

36. When Cu^{2+} ion is treated with KI, a white precipitate is formed. Explain the reaction with the help of the chemical equation.

Solution:



Cu^{2+} gets reduced to Cu^+ , and I^- gets oxidized to I_2 .

37. Out of Cu_2Cl_2 and CuCl_2 , which is more stable and why?

Solution:

CuCl_2 is more stable because Cu^{2+} has a higher electron density than Cu^+ . Cu^{2+} is smaller in size, has higher effective nuclear charge and therefore a higher hydration enthalpy Δ_{hyd} of Cu^{2+} , which makes it more stable.

38. When a brown compound of manganese (A) is treated with HCl it gives a gas (B). The gas taken in excess reacts with NH_3 to give an explosive compound (C). Identify compounds A, B and C.

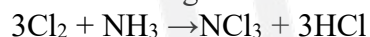
Solution:

When brown compound of manganese (A) is treated with HCl it gives chlorine gas.



(A) (B)

The chlorine gas reacts with NH_3 to give NCl_3



(B) (C)

The brown compound A = MnO_2

Gas B = Cl_2

Explosive compound C = NCl_3

39. Although fluorine is more electronegative than oxygen, the ability of oxygen to stabilise higher oxidation states exceeds that of fluorine. Why?

Solution:

Fluorine has one unpaired electron and forms a single bond, while Oxygen has two unpaired electrons and can form multiple bonds thereby stabilizing higher oxidation states.

40. Although Cr^{3+} and Co^{2+} ions have the same number of unpaired electrons the magnetic moment of Cr^{3+} is 3.87 B.M. and that of Co^{2+} is 4.87 B.M. Why?

Solution:

Cr^{3+} has a symmetrical electron distribution and will only have spin magnetic moment contribution whereas Co^{2+} has no symmetrical distribution of electrons so it will have an orbital magnetic moment and spin magnetic moment contribution. Therefore, the total magnetic moment for Co^{2+} will be higher than the Cr^{3+} .

41. Ionisation enthalpies of Ce, Pr and Nd are higher than Th, Pa and U. Why?

Solution:

Th, Pa and U, 5f electrons start filling and they have penetration lower than 4f electrons for Ce, Pr and Nd. Removing 4f electrons will be difficult, so ionization enthalpy for Th, Pa and U are lower than Ce,

Pr and Nd.

42. Although Zr belongs to 4d and Hf belongs to 5d transition series but it is quite difficult to separate them. Why?

Solution:

Due to the lanthanoid contraction poor f, orbital shielding leads to an increase in effective nuclear charge, which reduces the size of Hf. So the atomic radii of both Zr and Hf are similar which means they have similar physical and chemical properties and hence separation becomes difficult.

43. Although +3 oxidation states are the characteristic oxidation state of lanthanoids cerium shows +4 oxidation state also. Why?

Solution:

Ce – [Xe] 4f¹ 5d¹ 6s². Usually, lanthanoids lose the 5d and 6s electrons and show +3 oxidation state, but Cerium loses the one 4f electron also to attain Xenon's noble gas configuration which will make Ce⁴⁺ very stable.

44. Explain why the colour of KMnO₄ disappears when oxalic acid is added to its solution in acidic medium.

Solution:

This is a redox titration. The deep purple colour of KMnO₄ disappears due to the formation of MnSO₄.
$$5\text{H}_2\text{C}_2\text{O}_4 + 2\text{KMnO}_4 + 3\text{H}_2\text{SO}_4 \longrightarrow 2\text{MnSO}_4 + 8\text{H}_2\text{O} + \text{K}_2\text{SO}_4 + 10\text{CO}_2$$

45. When an orange solution containing Cr₂O₇²⁻ ion is treated with an alkali, a yellow solution is formed and when H⁺ ions are added to a yellow solution, an orange solution is obtained. Explain why does this happen?

Solution:

When Cr₂O₇²⁻ is treated with an alkali:
(orange) Cr₂O₇²⁻ + OH⁻ → 2CrO₄²⁻ (yellow)

When the yellow solution is treated with an acid, we get back the orange solution:
(yellow) 2CrO₄²⁻ + 2H⁺ → Cr₂O₇²⁻ (orange) + H₂O

46. A solution of KMnO₄ on reduction yields either colourless solution or a brown precipitate or a green solution depending on the pH of the solution. What different stages of the reduction do these represent and how are they carried out?

Solution:

In acidic medium, permanganate changes to manganous ion which is colourless.
$$\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \longrightarrow \text{Mn}^{2+} + 4\text{H}_2\text{O}$$

(colourless)

In alkaline medium, permanganate changes to manganate, which is a green solution
$$\text{MnO}_4^- + \text{e}^- \longrightarrow \text{MnO}_4^{2-}$$

(green)

In a neutral medium, permanganate changes to manganese dioxide which is a brown precipitate,
$$\text{MnO}_4^- + 2\text{H}_2\text{O} + 3\text{e}^- \longrightarrow \text{MnO}_2 + 4\text{OH}^-$$

(brown)

47. The second and third rows of transition elements resemble each other much more than they resemble the first row. Explain why?

Solution:

Due to poor f orbital shielding, effective nuclear charge increases and there is a contraction in the size of the third-row elements. This contraction in size is called Lanthanide contraction. The second and third row of transition elements have similar atomic radii and therefore they resemble each other more.

48. E° of Cu is + 0.34V while that of Zn is – 0.76V. Explain.

Solution:

The reduced form of Cu^{2+} is more stable than the oxidized form of Cu. Therefore, the value of E° is positive for Cu. Removing two electrons gives a stable configuration $[\text{Ar}]3d^{10}$ with filled orbitals. So, the oxidized form is more stable than the reduced form. Therefore, the value of E° is negative for Zn.

49. The halides of transition elements become more covalent with increasing oxidation state of the metal. Why?

Solution:

Halides become more covalent with increasing oxidation state. As the oxidation state increases, the charge on the atom increases and the size of the ion of transition element decreases. Fajan's rule states that greater the charge on an atom, greater the covalent character.

50. While filling up of electrons in the atomic orbitals, the 4s orbital is filled before the 3d orbital but the reverse happens during the ionisation of the atom. Explain why?

Solution:

Electrons are filled according to the $n+1$ rule. If an orbital has lower $n+1$ value, then the electron will enter that orbital.

For 3d, $n+1 = 3+2=5$

4s, $n+1 = 4+0=4$

So, the electron will first enter 4s and then 3d while filling. But, 4s electrons are held loose by the nucleus and are outside of 3d, so removing a 4s electron becomes easier than removing a 3d electron.

51. Reactivity of transition elements decreases almost regularly from Sc to Cu. Explain.

Solution:

Effective nuclear charge increases as we move along the period from left to right. Due to the reason, the size also reduces. Therefore the electrons will be held more tightly and so that removing of the electron will be difficult from the outermost shell. So that ionization enthalpy also increases. Therefore, reactivity also decreases. Sc is more reactive than Cu.

CLICK TO DOWNLOAD NCERT EXEMPLAR SOLUTIONS

CLASS 12: CHEMISTRY (ALL CHAPTERS)





JOIN OUR WHATSAPP GROUPS

FOR FREE EDUCATIONAL
RESOURCES





JOIN SCHOOL OF EDUCATORS WHATSAPP GROUPS FOR FREE EDUCATIONAL RESOURCES

We are thrilled to introduce the School of Educators WhatsApp Group, a platform designed exclusively for educators to enhance your teaching & Learning experience and learning outcomes. Here are some of the key benefits you can expect from joining our group:

BENEFITS OF SOE WHATSAPP GROUPS

- **Abundance of Content:** Members gain access to an extensive repository of educational materials tailored to their class level. This includes various formats such as PDFs, Word files, PowerPoint presentations, lesson plans, worksheets, practical tips, viva questions, reference books, smart content, curriculum details, syllabus, marking schemes, exam patterns, and blueprints. This rich assortment of resources enhances teaching and learning experiences.
- **Immediate Doubt Resolution:** The group facilitates quick clarification of doubts. Members can seek assistance by sending messages, and experts promptly respond to queries. This real-time interaction fosters a supportive learning environment where educators and students can exchange knowledge and address concerns effectively.
- **Access to Previous Years' Question Papers and Topper Answers:** The group provides access to previous years' question papers (PYQ) and exemplary answer scripts of toppers. This resource is invaluable for exam preparation, allowing individuals to familiarize themselves with the exam format, gain insights into scoring techniques, and enhance their performance in assessments.

- **Free and Unlimited Resources:** Members enjoy the benefit of accessing an array of educational resources without any cost restrictions. Whether its study materials, teaching aids, or assessment tools, the group offers an abundance of resources tailored to individual needs. This accessibility ensures that educators and students have ample support in their academic endeavors without financial constraints.
- **Instant Access to Educational Content:** SOE WhatsApp groups are a platform where teachers can access a wide range of educational content instantly. This includes study materials, notes, sample papers, reference materials, and relevant links shared by group members and moderators.
- **Timely Updates and Reminders:** SOE WhatsApp groups serve as a source of timely updates and reminders about important dates, exam schedules, syllabus changes, and academic events. Teachers can stay informed and well-prepared for upcoming assessments and activities.
- **Interactive Learning Environment:** Teachers can engage in discussions, ask questions, and seek clarifications within the group, creating an interactive learning environment. This fosters collaboration, peer learning, and knowledge sharing among group members, enhancing understanding and retention of concepts.
- **Access to Expert Guidance:** SOE WhatsApp groups are moderated by subject matter experts, teachers, or experienced educators can benefit from their guidance, expertise, and insights on various academic topics, exam strategies, and study techniques.

Join the School of Educators WhatsApp Group today and unlock a world of resources, support, and collaboration to take your teaching to new heights. To join, simply click on the group links provided below or send a message to +91-95208-77777 expressing your interest.

**Together, let's empower ourselves & Our Students and
inspire the next generation of learners.**

**Best Regards,
Team
School of Educators**

Join School of Educators WhatsApp Groups

You will get Pre- Board Papers PDF, Word file, PPT, Lesson Plan, Worksheet, practical tips and Viva questions, reference books, smart content, curriculum, syllabus, marking scheme, toppers answer scripts, revised exam pattern, revised syllabus, Blue Print etc. here . Join Your Subject / Class WhatsApp Group.

Kindergarten to Class XII (For Teachers Only)



[Click Here to Join](#)

Class 1



[Click Here to Join](#)

Class 2



[Click Here to Join](#)

Class 3



[Click Here to Join](#)

Class 4



[Click Here to Join](#)

Class 5



[Click Here to Join](#)

Class 6



[Click Here to Join](#)

Class 7



[Click Here to Join](#)

Class 8



[Click Here to Join](#)

Class 9



[Click Here to Join](#)

Class 10



[Click Here to Join](#)

Class 11 (Science)



[Click Here to Join](#)

Class 11 (Humanities)



[Click Here to Join](#)

Class 11 (Commerce)



[Click Here to Join](#)

Class 12 (Science)



[Click Here to Join](#)

Class 12 (Humanities)



[Click Here to Join](#)

Class 12 (Commerce)



[Click Here to Join](#)

Kindergarten

Subject Wise Secondary and Senior Secondary Groups (IX & X For Teachers Only)

Secondary Groups (IX & X)



[Click Here to Join](#)

SST



[Click Here to Join](#)

Mathematics



[Click Here to Join](#)

Science



[Click Here to Join](#)

English



[Click Here to Join](#)

Hindi-A



[Click Here to Join](#)

IT Code-402



[Click Here to Join](#)

Hindi-B



[Click Here to Join](#)

Artificial Intelligence

Senior Secondary Groups (XI & XII For Teachers Only)



[Click Here to Join](#)

Physics



[Click Here to Join](#)

Chemistry



[Click Here to Join](#)

English



[Click Here to Join](#)

Mathematics



[Click Here to Join](#)

Biology



[Click Here to Join](#)

Accountancy



[Click Here to Join](#)

Economics



[Click Here to Join](#)

BST



[Click Here to Join](#)

History



[Click Here to Join](#)

Geography



[Click Here to Join](#)

Sociology



[Click Here to Join](#)

Hindi Elective



[Click Here to Join](#)

Hindi Core



[Click Here to Join](#)

Home Science



[Click Here to Join](#)

Sanskrit



[Click Here to Join](#)

Psychology



[Click Here to Join](#)

Political Science



[Click Here to Join](#)

Painting



[Click Here to Join](#)

Vocal Music



[Click Here to Join](#)

Comp. Science



[Click Here to Join](#)

IP



[Click Here to Join](#)

Physical Education



[Click Here to Join](#)

APP. Mathematics



[Click Here to Join](#)

Legal Studies



[Click Here to Join](#)

Entrepreneurship



[Click Here to Join](#)

French



[Click Here to Join](#)

IT



[Click Here to Join](#)

Artificial Intelligence

Other Important Groups (For Teachers & Principal's)



[Click Here to Join](#)

Principal's Group



[Click Here to Join](#)

Teachers Jobs



[Click Here to Join](#)

IIT/NEET

Join School of Educators WhatsApp Groups

You will get Pre- Board Papers PDF, Word file, PPT, Lesson Plan, Worksheet, practical tips and Viva questions, reference books, smart content, curriculum, syllabus, marking scheme, toppers answer scripts, revised exam pattern, revised syllabus, Blue Print etc. here . Join Your Subject / Class WhatsApp Group.

Kindergarten to Class XII (For Students Only)



[Click Here to Join](#)

Class 1



[Click Here to Join](#)

Class 2



[Click Here to Join](#)

Class 3



[Click Here to Join](#)

Class 4



[Click Here to Join](#)

Class 5



[Click Here to Join](#)

Class 6



[Click Here to Join](#)

Class 7



[Click Here to Join](#)

Class 8



[Click Here to Join](#)

Class 9



[Click Here to Join](#)

Class 10



[Click Here to Join](#)

Class 11 (Science)



[Click Here to Join](#)

Class 11 (Humanities)



[Click Here to Join](#)

Class 11 (Commerce)



[Click Here to Join](#)

Class 12 (Science)



[Click Here to Join](#)

Class 12 (Humanities)



[Click Here to Join](#)

Class 12 (Commerce)



[Click Here to Join](#)

**Artificial Intelligence
(VI TO VIII)**

Subject Wise Secondary and Senior Secondary Groups (IX & X For Students Only) Secondary Groups (IX & X)



[Click Here to Join](#)

SST



[Click Here to Join](#)

Mathematics



[Click Here to Join](#)

Science



[Click Here to Join](#)

English



[Click Here to Join](#)

Hindi



[Click Here to Join](#)

IT Code



[Click Here to Join](#)

Artificial Intelligence

Senior Secondary Groups (XI & XII For Students Only)



[Click Here to Join](#)

Physics



[Click Here to Join](#)

Chemistry



[Click Here to Join](#)

English



[Click Here to Join](#)

Mathematics



[Click Here to Join](#)

Biology



[Click Here to Join](#)

Accountancy



[Click Here to Join](#)

Economics



[Click Here to Join](#)

BST



[Click Here to Join](#)

History



[Click Here to Join](#)

Geography



[Click Here to Join](#)

Sociology



[Click Here to Join](#)

Hindi Elective



[Click Here to Join](#)

Hindi Core



[Click Here to Join](#)

Home Science



[Click Here to Join](#)

Sanskrit



[Click Here to Join](#)

Psychology



[Click Here to Join](#)

Political Science



[Click Here to Join](#)

Painting



[Click Here to Join](#)

Music



[Click Here to Join](#)

Comp. Science



[Click Here to Join](#)

IP



[Click Here to Join](#)

Physical Education



[Click Here to Join](#)

APP. Mathematics



[Click Here to Join](#)

Legal Studies



[Click Here to Join](#)

Entrepreneurship



[Click Here to Join](#)

French



[Click Here to Join](#)

IT



[Click Here to Join](#)

AI



[Click Here to Join](#)

IIT/NEET



[Click Here to Join](#)

CUET

Groups Rules & Regulations:

To maximize the benefits of these WhatsApp groups, follow these guidelines:

1. Share your valuable resources with the group.
2. Help your fellow educators by answering their queries.
3. Watch and engage with shared videos in the group.
4. Distribute WhatsApp group resources among your students.
5. Encourage your colleagues to join these groups.

Additional notes:

1. Avoid posting messages between 9 PM and 7 AM.
2. After sharing resources with students, consider deleting outdated data if necessary.
3. It's a NO Nuisance groups, single nuisance and you will be removed.
 - No introductions.
 - No greetings or wish messages.
 - No personal chats or messages.
 - No spam. Or voice calls
 - Share and seek learning resources only.

Please only share and request learning resources. For assistance, contact the helpline via WhatsApp: +91-95208-77777.

Join Premium WhatsApp Groups Ultimate Educational Resources!!

Join our premium groups and just Rs. 1000 and gain access to all our exclusive materials for the entire academic year. Whether you're a student in Class IX, X, XI, or XII, or a teacher for these grades, Artham Resources provides the ultimate tools to enhance learning. Pay now to delve into a world of premium educational content!

[Click here for more details](#)



Click Here to Join

Class 9



Click Here to Join

Class 10



Click Here to Join

Class 11



Click Here to Join

Class 12

📢 Don't Miss Out! Elevate your academic journey with top-notch study materials and secure your path to top scores! Revolutionize your study routine and reach your academic goals with our comprehensive resources. Join now and set yourself up for success! 🇧🇩🌟

Best Wishes,

Team

School of Educators & Artham Resources

SKILL MODULES BEING OFFERED IN MIDDLE SCHOOL



Artificial Intelligence



Beauty & Wellness



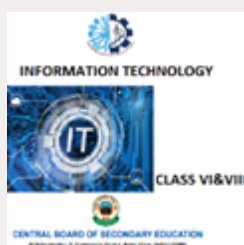
Design Thinking & Innovation



Financial Literacy



Handicrafts



Information Technology



Marketing/Commercial Application



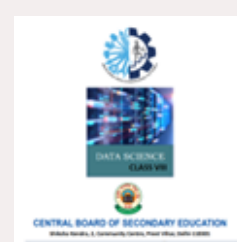
Mass Media - Being Media Literate



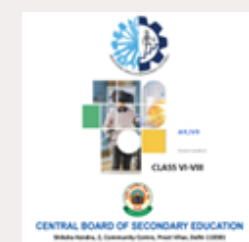
Travel & Tourism



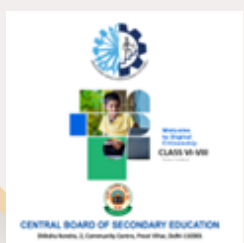
Coding



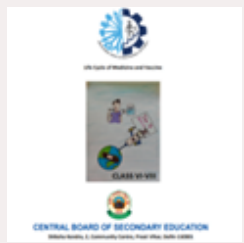
Data Science (Class VIII only)



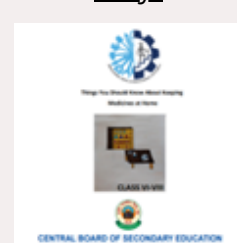
Augmented Reality / Virtual Reality



Digital Citizenship



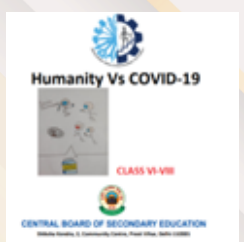
Life Cycle of Medicine & Vaccine



Things you should know about keeping Medicines at home



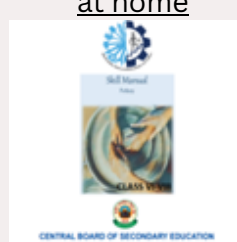
What to do when Doctor is not around



Humanity & Covid-19



Blue Pottery



Pottery



Block Printing



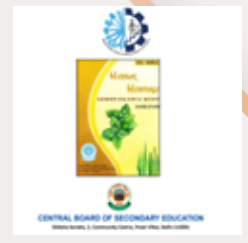
Food



Food Preservation



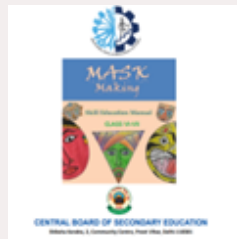
Baking



Herbal Heritage



Khadi



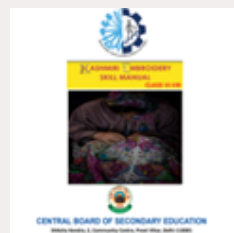
Mask Making



Mass Media



Making of a Graphic Novel



Kashmiri Embroidery



Embroidery



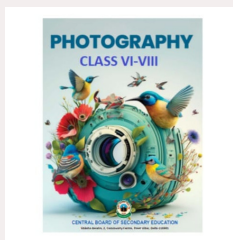
Rockets



Satellites



Application of Satellites

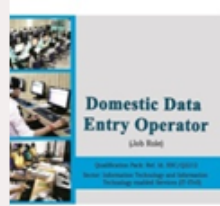


Photography

SKILL SUBJECTS AT SECONDARY LEVEL (CLASSES IX – X)



Retail



Information Technology



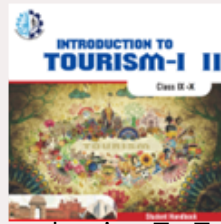
Security



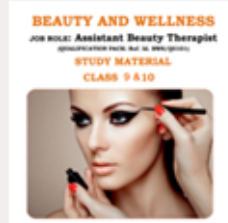
Automotive



Introduction To Financial Markets



Introduction To Tourism



Beauty & Wellness



Agriculture



Food Production



Front Office Operations



Banking & Insurance



Marketing & Sales



Health Care



Apparel



Multi Media



Multi Skill Foundation Course



Artificial Intelligence



Physical Activity Trainer



Data Science



Electronics & Hardware (NEW)

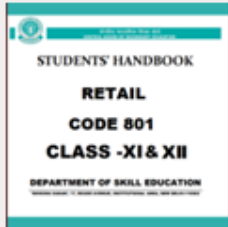


Foundation Skills For Sciences (Pharmaceutical & Biotechnology)(NEW)

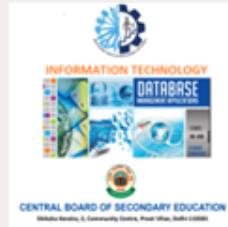


Design Thinking & Innovation (NEW)

SKILL SUBJECTS AT SR. SEC. LEVEL (CLASSES XI – XII)



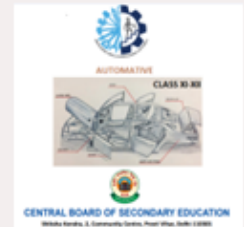
Retail



Information Technology



Web Application



Automotive



Financial Markets Management



Tourism



Beauty & Wellness



Agriculture



Food Production



Front Office Operations



Banking



Marketing



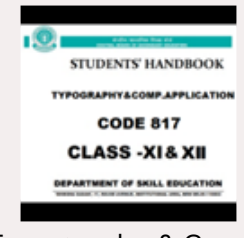
Health Care



Insurance



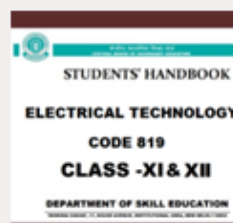
Horticulture



Typography & Comp.
Application



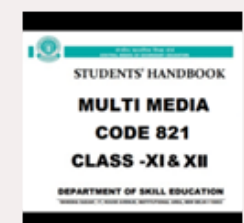
Geospatial Technology



Electrical Technology



Electronic Technology



Multi-Media



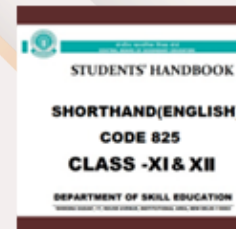
Taxation



Cost Accounting



Office Procedures & Practices



Shorthand (English)



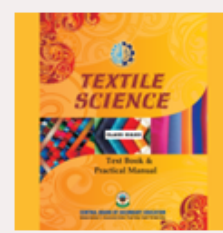
Shorthand (Hindi)



Air-Conditioning & Refrigeration



Medical Diagnostics



Textile Design



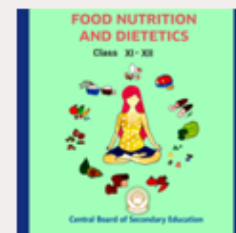
Design



Salesmanship



Business Administration



Food Nutrition & Dietetics



Mass Media Studies



Library & Information Science



Fashion Studies



Applied Mathematics



Yoga



Early Childhood Care & Education



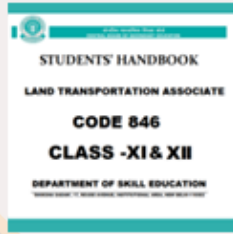
Artificial Intelligence



Data Science



Physical Activity Trainer(new)



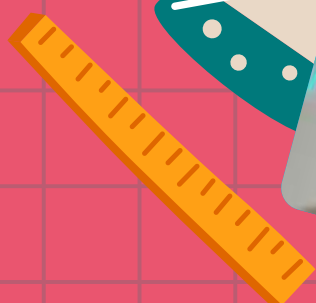
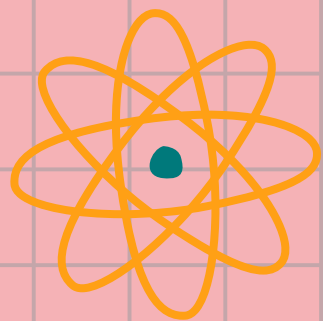
Land Transportation Associate (NEW)



Electronics & Hardware (NEW)



Design Thinking & Innovation (NEW)



- Pdf Purchase

- Print Purchase

- Amazon Print Purchase



Scan QR Code to join Telegram Groups & Channels for more free resources.

